

Abstract Submitted
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Investigation of the interface structure in sputtered WSi₂/Si multilayers by in-situ synchrotron X-ray scattering. YIPING WANG, HUA ZHOU, LAN ZHOU, RANDALL L. HEADRICK, University of Vermont, Department of Physics, Burlington, VT 05405, ALBERT. T. MACRANDER, Advanced Photon Source, Argonne National Laboratory, Argonne, Illinois 6043, KARL F. LUDWIG, Boston University, Department of Physics, Boston, MA 02215 — Multilayer X-ray optics have many applications such as X-ray microscopy, X-ray lithography, and X-ray microanalysis. The interface imperfections are critical to the optical performance of the multilayer structures. We report on the growth of WSi₂ and Si amorphous thin films by dc magnetron sputtering in a vacuum chamber with 10⁻⁹ Torr base pressure. In-situ synchrotron X-ray scattering with high temporal resolution has been employed to probe the surface and interface roughness evolution during film deposition. X-ray reflectivity simulations were performed using the IMD software package. It is found that the structure of WSi₂/Si multilayers is with an alternately smooth and rough interface. While Si layer roughens, WSi₂ layer is observed to smooth out an initially rough surface. The ion energy and flux assisting the growth may play a role in inducing this asymmetry in the interface roughness.

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